

## SEQUENCE LISTING

<110> Allen, Stephen M.  
Caimi, Perry G.  
Stoop, Johan M.

<120> Fructan Biosynthetic Enzymes

<130> BB1463 US NA

<140>

<141>

<150> 60/244,273

<151> 2000-10-10

<150> 60/269,543

<151> 2001-02-16

<160> 21

<170> Microsoft Office 97

<210> 1

<211> 2080

<212> DNA

<213> Dimorphotheca sinuata

<400> 1

gcacgagctt	aatcagccca	ttttcctcca	ccatgacaac	caccaaacc	tttagtgacc	60
ttgaggacgc	acccctactg	aaccacaccg	aaccaccacc	accaccgcca	ccgccaaactg	120
ccggaagaaa	acggttggtg	atcaaggttg	tgtcagttat	caccctactc	attttgctta	180
ttgtttcagt	ttgtttctc	aaccaacaaa	attcaagtca	ctccaccacc	aattcaaaat	240
cgatctccca	atccgatcgc	ctcatttggg	aaagaacatc	tttcattttt	caaccgcca	300
aaaatttcat	ttacgatccc	aatgggcca	tatttcacat	gggttggtac	catcttttct	360
atcaatacaa	cccgtacggg	cctgtttggg	gaaatatgtc	atgggggtcac	tccgtttcca	420
aagacatgat	caactggttt	gagcttccag	tgcgattggt	cccaaccgaa	tggtacgata	480
tcgaggggtg	tttatccggg	tccaccaccg	tctcccca	cgggtcaaate	ttcgatttgt	540
acacagga	cgtaacgat	ttctcccaat	tacaatgcaa	agctgtaccc	gtcaacatat	600
ctgaccact	tcttatcgag	tggtgcaaat	acgatggtaa	cccaatcctg	tatactccac	660
cagggattgg	gttaaaagac	tatcgggacc	cgtcaacagt	ctggacgggt	cccgatggaa	720
aacatcggat	gatcatggga	tctaaacgaa	acaaacggg	actagtactt	gtttaccaca	780
caaccgat	cacaaattat	gtgatgtcgg	atgagccgtt	gcattcggta	cctaataccg	840
atatgtggga	atgcgttgac	ttttaccctg	tttcgttgac	caatgatagc	gcgcttgata	900
tggcggtcta	tgggtcgggt	atcaaacacg	tgattaaaga	aagttgggag	ggacatggaa	960
tggattggta	ttcgattggg	acttatgatg	catcaaccga	taaatggact	ccggataacc	1020
cgaaattaga	tgtgggtatc	gggttgcgat	gtgattacgg	aaagtgtttt	gcatacgaaga	1080
gtcttttcga	tccgttgaag	aaaaggaggg	tgacttgggg	ttatgttggg	gaatcagata	1140
aacctgatca	ggacctctct	agaggatggg	ctaccattta	taatgttgca	cggacggtgg	1200
tactagatag	aaagaccgga	acacatctac	ttcattggcc	agttgaagaa	atcgagagtt	1260
tgagatccaa	tggtcaagaa	ttcaacgaga	ttgaactcaa	accgggttcg	atcattccac	1320
ttgacatagg	ctcggtact	cagttggaca	tagttgcgac	atttgaagtg	gatcaagatg	1380
cgttgaaaagc	tataagtga	accaacgaag	aatatatttg	taccaaagc	tggggtgcag	1440
ccggaagggg	aagtttgga	ccatttgggg	ttgcggtttt	agccgatgga	acactttcag	1500
agtttaactcc	cgtgtatttc	tacatagcta	aaaatacgga	tggaagtgtg	gcaacacatt	1560
tttgtaaccga	taagctaaga	tcatcactag	attatgatcg	tgaagagagt	gtgtatggaa	1620
gcactgtccc	tgtgcttgat	ggtgaagaac	tcacaatgag	gttattgggtg	gaccattcgg	1680
tagtagaagg	gtttgcgcaa	ggaggaagga	cggtaataac	atcaagggtc	tatccgacaa	1740
aggcaatata	cgacaacgcg	aaggtgttct	tattcaacaa	cgctactggt	acgagtgtga	1800
aggcgctctct	caagatttg	caaattggctc	ctgccagat	taaaccttac	cctctttaat	1860

catatgtttc atttcactct cactagaaca cttgctgtta ctattattgt atcttatatt 1920  
 ttttatatgt acgtaataat taccgttttg atggttttgt tttgttcaac ctctgcattg 1980  
 tgtgttaagt agtaagccgc gattatttta ataatatgaa taggttgttt tgttcaaaaa 2040  
 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 2080

<210> 2  
 <211> 608  
 <212> PRT  
 <213> Dimorphotheca sinuata

<400> 2  
 Met Thr Thr Thr Lys Pro Phe Ser Asp Leu Glu Asp Ala Pro Leu Leu  
 1 5 10 15  
 Asn His Thr Glu Pro Pro Pro Pro Pro Pro Pro Thr Ala Gly Arg  
 20 25 30  
 Lys Arg Leu Leu Ile Lys Val Val Ser Val Ile Thr Leu Leu Ile Leu  
 35 40 45  
 Leu Ile Val Ser Val Leu Phe Leu Asn Gln Gln Asn Ser Ser His Ser  
 50 55 60  
 Thr Thr Asn Ser Lys Ser Ile Ser Gln Ser Asp Arg Leu Ile Trp Glu  
 65 70 75 80  
 Arg Thr Ser Phe His Phe Gln Pro Ala Lys Asn Phe Ile Tyr Asp Pro  
 85 90 95  
 Asn Gly Pro Leu Phe His Met Gly Trp Tyr His Leu Phe Tyr Gln Tyr  
 100 105 110  
 Asn Pro Tyr Gly Pro Val Trp Gly Asn Met Ser Trp Gly His Ser Val  
 115 120 125  
 Ser Lys Asp Met Ile Asn Trp Phe Glu Leu Pro Val Ala Leu Val Pro  
 130 135 140  
 Thr Glu Trp Tyr Asp Ile Glu Gly Val Leu Ser Gly Ser Thr Thr Val  
 145 150 155 160  
 Leu Pro Asn Gly Gln Ile Phe Ala Leu Tyr Thr Gly Asn Ala Asn Asp  
 165 170 175  
 Phe Ser Gln Leu Gln Cys Lys Ala Val Pro Val Asn Ile Ser Asp Pro  
 180 185 190  
 Leu Leu Ile Glu Trp Val Lys Tyr Asp Gly Asn Pro Ile Leu Tyr Thr  
 195 200 205  
 Pro Pro Gly Ile Gly Leu Lys Asp Tyr Arg Asp Pro Ser Thr Val Trp  
 210 215 220  
 Thr Gly Pro Asp Gly Lys His Arg Met Ile Met Gly Ser Lys Arg Asn  
 225 230 235 240  
 Lys Thr Gly Leu Val Leu Val Tyr His Thr Thr Asp Phe Thr Asn Tyr  
 245 250 255

Val	Met	Ser	Asp	Glu	Pro	Leu	His	Ser	Val	Pro	Asn	Thr	Asp	Met	Trp	260	265	270
Glu	Cys	Val	Asp	Phe	Tyr	Pro	Val	Ser	Leu	Thr	Asn	Asp	Ser	Ala	Leu	275	280	285
Asp	Met	Ala	Ala	Tyr	Gly	Ser	Gly	Ile	Lys	His	Val	Ile	Lys	Glu	Ser	290	295	300
Trp	Glu	Gly	His	Gly	Met	Asp	Trp	Tyr	Ser	Ile	Gly	Thr	Tyr	Asp	Ala	305	310	315
Ser	Thr	Asp	Lys	Trp	Thr	Pro	Asp	Asn	Pro	Lys	Leu	Asp	Val	Gly	Ile	325	330	335
Gly	Leu	Arg	Cys	Asp	Tyr	Gly	Lys	Phe	Phe	Ala	Ser	Lys	Ser	Leu	Phe	340	345	350
Asp	Pro	Leu	Lys	Lys	Arg	Arg	Val	Thr	Trp	Gly	Tyr	Val	Gly	Glu	Ser	355	360	365
Asp	Lys	Pro	Asp	Gln	Asp	Leu	Ser	Arg	Gly	Trp	Ala	Thr	Ile	Tyr	Asn	370	375	380
Val	Ala	Arg	Thr	Val	Val	Leu	Asp	Arg	Lys	Thr	Gly	Thr	His	Leu	Leu	385	390	395
His	Trp	Pro	Val	Glu	Glu	Ile	Glu	Ser	Leu	Arg	Ser	Asn	Gly	Gln	Glu	405	410	415
Phe	Asn	Glu	Ile	Glu	Leu	Lys	Pro	Gly	Ser	Ile	Ile	Pro	Leu	Asp	Ile	420	425	430
Gly	Ser	Ala	Thr	Gln	Leu	Asp	Ile	Val	Ala	Thr	Phe	Glu	Val	Asp	Gln	435	440	445
Asp	Ala	Leu	Lys	Ala	Ile	Ser	Glu	Thr	Asn	Glu	Glu	Tyr	Ile	Cys	Thr	450	455	460
Lys	Ser	Trp	Gly	Ala	Ala	Gly	Arg	Gly	Ser	Leu	Gly	Pro	Phe	Gly	Val	465	470	475
Ala	Val	Leu	Ala	Asp	Gly	Thr	Leu	Ser	Glu	Leu	Thr	Pro	Val	Tyr	Phe	485	490	495
Tyr	Ile	Ala	Lys	Asn	Thr	Asp	Gly	Ser	Val	Ala	Thr	His	Phe	Cys	Thr	500	505	510
Asp	Lys	Leu	Arg	Ser	Ser	Leu	Asp	Tyr	Asp	Arg	Glu	Arg	Val	Val	Tyr	515	520	525
Gly	Ser	Thr	Val	Pro	Val	Leu	Asp	Gly	Glu	Glu	Leu	Thr	Met	Arg	Leu	530	535	540
Leu	Val	Asp	His	Ser	Val	Val	Glu	Gly	Phe	Ala	Gln	Gly	Gly	Arg	Thr	545	550	555
Val	Ile	Thr	Ser	Arg	Val	Tyr	Pro	Thr	Lys	Ala	Ile	Tyr	Asp	Asn	Ala	565	570	575



[illegible]

FOOEOF=26E000F

Gly Leu Arg Cys Asp Tyr Gly Arg Phe Phe Ala Ser Lys Ser Ile Phe  
340 345 350

Asp Pro Val Lys Lys Arg Arg Ile Thr Trp Ala Tyr Val Gly Glu Ser  
355 360 365

Asp Asn Ala Asp Asp Asp Leu Ser Arg Gly Trp Ala Thr Ile Tyr Asn  
370 375 380

Val Gly Arg Thr Ile Val Leu Asp Arg Lys Thr Gly Thr His Leu Leu  
385 390 395 400

His Trp Pro Val Glu Glu Ile Glu Ser Leu Arg Tyr Asn Gly Gln Glu  
405 410 415

Phe Lys Glu Ile Lys Leu Glu Pro Gly Ser Ile Ala Pro Leu Asp Ile  
420 425 430

Gly Thr Ala Thr Gln Leu Asp Ile Val Ala Thr Phe Lys Val Asp Glu  
435 440 445

Ala Ala Leu Asn Ala Thr Ser Glu Thr Asp Asp Asn Phe Ala Cys Thr  
450 455 460

Thr Ser Ser Gly Ala Val Glu Arg Gly Ser Leu Gly Pro Phe Gly Leu  
465 470 475 480

Ala Val Leu Ala Asp Gly Thr Leu Ser Glu Leu Thr Pro Val Tyr Phe  
485 490 495

Tyr Ile Ala Lys Lys Ala Asp Gly Gly Val Ser Thr His Phe Cys Thr  
500 505 510

Asp Lys Leu Arg Ser Ser Leu Asp Phe Asp Lys Glu Arg Val Val Tyr  
515 520 525

Gly Ser Thr Val Pro Val Leu Asp Asp Glu Glu Leu Thr Met Arg Leu  
530 535 540

Leu Val Asp His Ser Val Val Glu Ala Phe Ala Gln Gly Gly Arg Ile  
545 550 555 560

Ala Ile Thr Ser Arg Val Tyr Pro Thr Lys Ala Ile Tyr Glu Gly Ala  
565 570 575

Lys Leu Phe Leu Phe Asn Asn Ala Thr Asp Thr Ser Val Lys Ala Ser  
580 585 590

Leu Lys Ile Trp Gln Met Ala Ser Ala Gln Ile His Gln Tyr Glu Phe  
595 600 605

Asn

<210> 5  
<211> 1333  
<212> DNA  
<213> Helianthus sp.

```

<400> 5
gcacgaggtc aacagtcttg acaggtcccg atggaaagca taggatgatc atgggatcta 60
aacgtggcaa tacaggcatg atactcgttt accataccac cgattacacg aactacgagt 120
tggttgatga gccgttgcac tccgttccca acaccgatat gtgggaatgc gtcgactttt 180
acccggtttc gttaaccaat gatagtgcac ttgatatggc ggcctatggg tcgggtatca 240
aacacgttat taaagaaagt tgggagggac atggaatgga ttggtattca atcgggacat 300
atgacgcgat aaatgataaa tggactcccg ataaccgga actagatgtc ggtatcgggt 360
tacggtgcga ttacgggaag ttttttgcat caaagagtct ttatgacca ttgaagaaaa 420
ggaggggtcac ttgggcttat gttggagaat cagatagtgt tgaccaggac ctctctagag 480
gatgggctac tgtttataat gttggaagaa caattgtact agatagaaaa accgggaccc 540
atctacttca ttggcccgtt gaggaggtcg agagtttgag atacaacggt caggagttaa 600
aagagatcga gctagagccc ggttcaatca ttccactcga cataggcacg gctacacagt 660
tggacatagt tgcaacattt gaggtggatc aagcagcgtt gaacgcgaca agtgaaccg 720
atgatattta tgggtgcacc actagcttag gtgcagccca aaggggaagt ttgggacccat 780
ttggtcttgc ggttctagcc gatggaaccc tttctgagtt aactccggtt tatttctaca 840
ttgctaaaaa ggccgatgga ggtttgtcga cacatttttg taccgataag ctaagggtcat 900
cactggatta tgatggacag agagtgggtg atgggagcac tgttcctgtg ttagatgatg 960
aagaactcac aatgaggcta ttggtggatc attcgatagt agagggggtt gcgcaaggag 1020
gaaggacggt tataacatca aggtgtatc caacaaaagc gatatacgaa caagcgaagt 1080
tggtcttggt caacaacgct acaggtacga gtgtgaaggc atctctcaag atttggcaaa 1140
tggcttctgc acaaattcat caatactcgt tttaattacc ggctattgct atctttttgt 1200
tattggtatt tatgtatctt aattttcttt taaacctttt tatttgataa atattggttc 1260
ttgttattgt gattctagta gtaaatgaat ggtgttttgg gttatctgtt aaaaaaaaaa 1320
aaaaaaaaaa aaa 1333

```

```

<210> 6
<211> 390
<212> PRT
<213> Helianthus sp.

```

```

<400> 6
Thr Arg Ser Thr Val Trp Thr Gly Pro Asp Gly Lys His Arg Met Ile
  1             5             10             15

Met Gly Ser Lys Arg Gly Asn Thr Gly Met Ile Leu Val Tyr His Thr
          20             25             30

Thr Asp Tyr Thr Asn Tyr Glu Leu Leu Asp Glu Pro Leu His Ser Val
  35             40             45

Pro Asn Thr Asp Met Trp Glu Cys Val Asp Phe Tyr Pro Val Ser Leu
  50             55             60

Thr Asn Asp Ser Ala Leu Asp Met Ala Ala Tyr Gly Ser Gly Ile Lys
  65             70             75             80

His Val Ile Lys Glu Ser Trp Glu Gly His Gly Met Asp Trp Tyr Ser
          85             90             95

Ile Gly Thr Tyr Asp Ala Ile Asn Asp Lys Trp Thr Pro Asp Asn Pro
 100             105             110

Glu Leu Asp Val Gly Ile Gly Leu Arg Cys Asp Tyr Gly Lys Phe Phe
 115             120             125

Ala Ser Lys Ser Leu Tyr Asp Pro Leu Lys Lys Arg Arg Val Thr Trp
 130             135             140

Ala Tyr Val Gly Glu Ser Asp Ser Val Asp Gln Asp Leu Ser Arg Gly
 145             150             155             160

```

[illegible]

<211> 1844

<212> DNA

<213> Triticum aestivum

<400> 7

52

```

tcgactttcta ccctgtcggt cgccgtagca gcgacaactc atcggagatg ttgcacgtgt 540
tgaaggcgag catggacgat gaacgacacg actactactc gctaggcacg tacgactcgg 600
cagcaaacac gtggacgccg attgaccggg acctcgactt ggggatcggg ctgaggtacg 660
attggggtaa gttttatgcg tccacctcgt tctatgatcc ggcgaagaag cggcgcggtgc 720
tgatggggta cgtcggcgag gtcgactcca agcgggctga tgtcgtgaag ggatgggcct 780
caattcagtc agttccaagg acaattgctc tcgacgagaa gaccgcgacg aacctcctcc 840
tctggcccgt ggaggagatt gagaccctcc gcctcaatgc cactgaactt agcgacgtca 900
ccatgaacac cggctccgtc atccatatcc ccctccgcca aggcactcag cttgacatcg 960
aggcaacttt ccaccttgat gcttctgcgc tcgctgccct caatgaggcc gatgtgggct 1020
acaactgcag cagcagcggc ggtgctgtta accgcggcgc gctaggcccc ttcggcctcc 1080
tcgtcctcgc tgcgtggtgac cgccgcggcg agcaaacggc ggtgtacttc tacgtgtcta 1140
ggggccttga tggaggcctc cataccagct tctgccaaaga tgagttacgg tcgtcacggg 1200
ccaaggacgt gacaaagcgg gtgattggga gcacggtgcc ggtgctcgac ggcgaggctt 1260
tctcaatgag ggtgctcgtg gaccactcca tcgtgcaggg cttcgcgatg ggcgggagga 1320
ccacgatgac gtcgcgggtg taccgatgg aggcctatca ggaggcaaaa gtgtacttgt 1380
tcaacaatgc caccggtgcc agcgttatgg cggaaaggct cgtcgtgcac gagatggact 1440
cggcacacaa ccagctctcc aatatggacg attactcgta tgttcaatga agctcttgca 1500
tctcatcagt aataagctac attggatcaa agacgctcac caaggaaggc caagacatat 1560
gtaaacgatt ccgcacagcc tcgcttgacg aattgaaaca tctatccttg ggtcatgttc 1620
tgcattgatg tcacagtga ctatattact ttggtgggtg taggatcgat atagtgtggg 1680
tgggtggaac tttgtttgtt tacatagtga accggtgtgg tctgcgtaat aagcttacgt 1740
gtttgttttag aaaatgaact attgttgttc gggagaaaaa aaaaaaaaaa aaaaaaaaaa 1800
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaa 1844

```

<210> 8  
 <211> 495  
 <212> PRT  
 <213> Triticum aestivum

<400> 8

Thr	Arg	Trp	Gly	His	Ala	Val	Ser	Arg	Asn	Leu	Val	Thr	Trp	Arg	Thr
1				5					10					15	
Leu	Pro	Ile	Ala	Met	Val	Ala	Asp	Gln	Trp	Tyr	Asp	Ile	Leu	Gly	Val
			20					25					30		
Leu	Ser	Gly	Ser	Met	Thr	Val	Leu	Pro	Asn	Gly	Thr	Val	Ile	Met	Ile
		35					40					45			
Tyr	Thr	Gly	Ala	Thr	Asn	Ala	Ser	Ala	Ile	Glu	Val	Gln	Cys	Ile	Ala
	50					55					60				
Thr	Pro	Ala	Asp	Pro	Asn	Asp	Pro	Phe	Leu	Arg	Arg	Trp	Thr	Lys	His
	65				70					75				80	
Pro	Ala	Asn	Pro	Val	Ile	Trp	Ser	Pro	Pro	Gly	Ile	Gly	Thr	Lys	Asp
				85				90						95	
Phe	Arg	Asp	Pro	Met	Thr	Ala	Trp	Tyr	Asp	Glu	Ser	Asp	Asp	Thr	Trp
		100						105					110		
Arg	Thr	Leu	Leu	Gly	Ser	Lys	Asp	Asp	Gln	Asp	Gly	His	His	Asp	Gly
		115				120						125			
Ile	Ala	Met	Met	Tyr	Lys	Thr	Lys	Asp	Phe	Leu	Asn	Tyr	Glu	Leu	Ile
	130					135					140				
Pro	Gly	Ile	Leu	His	Arg	Val	Glu	Arg	Thr	Gly	Glu	Trp	Glu	Cys	Ile
145					150					155				160	



Ala His Asn Gln Leu Ser Asn Met Asp Asp Tyr Ser Tyr Val Gln  
 485 490 495

<210> 9  
 <211> 1612  
 <212> DNA  
 <213> Triticum aestivum

<400> 9  
 gcacgagacg acatcctggg ggtcctttcg ggctctatga cggtgctacc aaatggcacg 60  
 gtcatcatga tctacacggg ggccaccaac gcctctgccg ttgaggtgca gtgcatcgcc 120  
 accccgcgg accccaacga ccccttctc cgcgctgga ccaagcacc cgccaacccc 180  
 gtcatctggt cgccgcggg gatcggcacc aaggattttc gagaccgat gactgcttgg 240  
 tacgatgaat ctgatgacac atggcgcacc ctccttgggt ccaaggatga ccacgacggg 300  
 caccacgatg ggatcgccat gatgtacaag accaaggact tccttaacta cgagctcatc 360  
 ccgggtatct tgcacgagat ccagcgcacc ggcgagtggt agtgattga cttctaccct 420  
 gtcggccaca gaagcaacga caactcatcg gagatgttgc acgtgttgaa ggcgagcatg 480  
 gacgacgaac ggcacgacta ctactcgcta ggcacgtacg actcggcagc aaacgcgtgg 540  
 acgcccgatc acccgagct cgacttgggg atcgggctga gatacgactg gggtaagtgt 600  
 tatgcgtcca cctcgttcta tgatccggca aagaagcggc gcgtgctgat ggggtacgtc 660  
 ggcgaggtcg actccaagcg ggctgatgtc gtgaagggtg gggcctcgat tcagtcagtt 720  
 ccaaggacaa ttgctctcga cgagaagacc cggacgaacc tcctcctctg gcccggtggag 780  
 gagattgaga cctccgcct caacgccacc gaacttagcg acgtcaccct taacaccggc 840  
 tccgtcatcc atatcccgct ccgccaaggc actcagctcg acatcgaggc aactttccac 900  
 cttgatgctt ctgccgtcgc tgccctcaat gagggccgatg tgggctacaa ctgcagcagc 960  
 agcggcggtg ctgttaaccg cggcgcgcta ggcccttctg gcctcctcgt cctcgtctgt 1020  
 ggtgaccgcc gtggcgagca aacggcggtg tatttctacg tgtctagggg gctcgacgga 1080  
 ggcctccata ccagcttctg ccaagacgag ttgcggtcgt cacgggcca ggtggtgacg 1140  
 aagcgggtga ttgggagcac ggtgccgggtg ctcgacggcg aggccttctc gatgaggggtg 1200  
 ctcgtggacc actccatcgt gcagggttgc gcgatgggcy ggaggaccac gatgacgtcg 1260  
 cgggtgtacc cgatggaggc ctatcaggag gcaaaagtgt acttgttcaa caatgcgacc 1320  
 ggtgccagcg tcatggcgga aaggctcgtc gtgcacgaga tggactcagc acacaaccag 1380  
 ctctccaata tggacgatca ctcgtatgtt caatgaagct cttgcatctc atcagtaata 1440  
 agctacattg gatcaaagac gcgcaccaag gaaggccaag acatatgtaa atgattccgc 1500  
 acagcctcgc ttgcagaatt gaaacatcta tccttgggtc atgttctgca ttgatgtcac 1560  
 tgtgaactac agtatattac tttgttgggc gtagaaaaaa aaaaaaaaaa aa 1612

<210> 10  
 <211> 471  
 <212> PRT  
 <213> Triticum aestivum

<400> 10  
 Ala Arg Asp Asp Ile Leu Gly Val Leu Ser Gly Ser Met Thr Val Leu  
 1 5 10 15  
 Pro Asn Gly Thr Val Ile Met Ile Tyr Thr Gly Ala Thr Asn Ala Ser  
 20 25 30  
 Ala Val Glu Val Gln Cys Ile Ala Thr Pro Ala Asp Pro Asn Asp Pro  
 35 40 45  
 Phe Leu Arg Arg Trp Thr Lys His Pro Ala Asn Pro Val Ile Trp Ser  
 50 55 60  
 Pro Pro Gly Ile Gly Thr Lys Asp Phe Arg Asp Pro Met Thr Ala Trp  
 65 70 75 80  
 Tyr Asp Glu Ser Asp Asp Thr Trp Arg Thr Leu Leu Gly Ser Lys Asp  
 85 90 95



Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ala Tyr Gln Glu Ala Lys  
420 425 430

Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Met Ala Glu Arg  
435 440 445

Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu Ser Asn Met  
450 455 460

Asp Asp His Ser Tyr Val Gln  
465 470

<210> 11  
<211> 476  
<212> DNA  
<213> Triticum aestivum

<400> 11  
gcacgagcca c gatgacgtc gcgggtgtac ccgatggagg cctatcagga ggcaaaagtg 60  
tacttggttca acaatgccac cggtgccagc gttacggcgg aaaggctcgt cgtgcacgag 120  
atggactcag cacacaacca gctctccaat atggacgatt actcgtatgt tcaatgaagc 180  
tcttgcatct catcagtaat aagctacatt ggatcaaaga cgctcaccaa ggaaggccaa 240  
gacatatatt taaacgattc cgcacagcct cgcttcgaga attgaaacat ctatccttgg 300  
gtcatgttct gcattgatgt cacagtgaac tatattactt tgttgggtgt aggatcgata 360  
tagtttgggt ggggtggaact ttgtttgttt acatagtgaac ccggtgtggt ctgcataata 420  
agcttatgtg tttgtttaga aaatgaatta ttgttggttaa aaaaaaaaaa aaaaaa 476

<210> 12  
<211> 58  
<212> PRT  
<213> Triticum aestivum

<400> 12  
Ala Arg Ala Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ala Tyr Gln  
1 5 10 15

Glu Ala Lys Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Thr  
20 25 30

Ala Glu Arg Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu  
35 40 45

Ser Asn Met Asp Asp Tyr Ser Tyr Val Gln  
50 55

<210> 13  
<211> 2093  
<212> DNA  
<213> Parthenium argentatum Grey

<400> 13  
gcacgagcgt gtacatagta aaaaaaccct ccagccacca catgatggct tcatctacca 60  
ccacctcccc tctcattctc cacgatgac ctagaaaacct ccaggaacct accggattta 120  
cggggggttcg tctgccatcc atcgcaaaag cgctttgcgt aaccttgggt tgggttatgg 180  
taatctgtgg tctggttgct gtaatcagca accagacaca ggtaccacaa gtagccaaca 240  
gccatcaagg tgccgccacc acattcaca ctcagttgcc aaaaatagat atgaaacggg 300  
ttccgggaga gttggattcg ggtgctgatg tccaatggca acgctccgct tatcattttc 360  
aacctgacaa aaactacatt agtgatcctg atggcccaat gtatcacatg ggatgggtacc 420  
atctatttta tcagtacaac ccagaatctg ccatatgggg caacatcaca tgggggtcact 480

```

ccgtatccaa agacatgac aactgggtcc atctcccttt cgccatgggt cgggaccatt 540
ggtacgacat cgaaggcgtc atgacagggt ccgccacagt cctcccaaac ggtgagatca 600
tcatgcttta cacgggcaat gcgtacgac tctcccaagt acaatgctta gcgtacgcag 660
tcaactcatc agatccactt cttatagagt ggaaaaaata cgaaggcaac ccggttttat 720
tgccgccgcc aggggtgggt tacaaggatt ttcgggaccc atctacattg tggctgggcc 780
ccgatggatg atatagaatg gtaatggggg ccaagcacia cgagactatt ggttgtgctt 840
tgattttacca taccactaat tttacgcatt ttgaattgaa tgaggagggtg cttcatgcgg 900
tcccacatac tggatatgtg gaatgcgttg atctttatcc ggtatccacc acacacacaa 960
acgggttga catggtggat aatgggcca atgtaaaata cgtgttgaaa caaagtgggg 1020
atgaagatcg ccatgattgg tatgcgattg gaagttatga ttgggtgaat gataagtgg 1080
accggatga cccgaaaac gatgtggga tcgggttaag atacgattac ggaaagtttt 1140
atgcgtccaa gacgttttat gaccaacata agaaaaggag ggtcctttgg ggctatgttg 1200
gagaaaccga tcccgaagg tatgacctta caaagggatg ggctaacata ttgaatatc 1260
caaggaccgt cgttttggac acgaaaacta aaaccaattt gattcaatgg ccaattgagg 1320
aaaccgaaaa acttaggtcg aaaaagtatg ataaatttgt agatgtggag cttcgaccgg 1380
ggtcactcat tcccctcgag ataggtacag ccacacagtt ggatatagtt gcgacattcg 1440
aagttgatca aatgatgttg gaatcaacgc tagaagccga tgttctattc aactgcacga 1500
ctagtgttgg ctcatgttga aggggcgtgt tgggaccgtt tgggtgtggtg gttctagctg 1560
atgccagcg caccgaacaa cttcctgtgt atttctatat tgcaaaagat accgacggga 1620
cgtcaagaac ctacttttgt gctgatgaaa caagatcatc caaggatgta gcgtgggga 1680
aatgggtgta tggaagcagt gttcctgtcc tccctaacga aaagtacaat atgaggttac 1740
tgggtgatca ttcgatagtg gagggatttg cacaaaacgg aagaacggtg gtgacatcga 1800
gagtgtatcc aacgaaggca atttacaacg ctgcgaaggt gtttttgttc aacaacgcga 1860
ccgggattag ggtgaaggcg tcggtcaaga tttggaagat ggcggaagca gaactcaacc 1920
ctttccagat tactgggtgg acttcttgat ggctagattt tggccctat atgtgtgtgt 1980
tactatcgtg aggtatatgt cttggactgt ggggggtatta ttgtaatttg atatgtatgt 2040
tctgttactt ttgaggttct agtttaaaaa aaaaaaaaaa aaaaaaaaaa aaa 2093

```

<210> 14

<211> 635

<212> PRT

<213> Parthenium argentatum Grey

<400> 14

Met Met Ala Ser Ser Thr Thr Thr Ser Pro Leu Ile Leu His Asp Asp  
1 5 10 15

Pro Glu Asn Leu Gln Glu Pro Thr Gly Phe Thr Gly Val Arg Arg Pro  
20 25 30

Ser Ile Ala Lys Ala Leu Cys Val Thr Leu Val Ser Val Met Val Ile  
35 40 45

Cys Gly Leu Val Ala Val Ile Ser Asn Gln Thr Gln Val Pro Gln Val  
50 55 60

Ala Asn Ser His Gln Gly Ala Ala Thr Thr Phe Thr Thr Gln Leu Pro  
65 70 75 80

Lys Ile Asp Met Lys Arg Val Pro Gly Glu Leu Asp Ser Gly Ala Asp  
85 90 95

Val Gln Trp Gln Arg Ser Ala Tyr His Phe Gln Pro Asp Lys Asn Tyr  
100 105 110

Ile Ser Asp Pro Asp Gly Pro Met Tyr His Met Gly Trp Tyr His Leu  
115 120 125

Phe Tyr Gln Tyr Asn Pro Glu Ser Ala Ile Trp Gly Asn Ile Thr Trp  
130 135 140

[illegible]

Thr Phe Glu Val Asp Gln Met Met Leu Glu Ser Thr Leu Glu Ala Asp  
 465 470 475 480  
 Val Leu Phe Asn Cys Thr Thr Ser Val Gly Ser Val Gly Arg Gly Val  
 485 490 495  
 Leu Gly Pro Phe Gly Val Val Val Leu Ala Asp Ala Gln Arg Thr Glu  
 500 505 510  
 Gln Leu Pro Val Tyr Phe Tyr Ile Ala Lys Asp Thr Asp Gly Thr Ser  
 515 520 525  
 Arg Thr Tyr Phe Cys Ala Asp Glu Thr Arg Ser Ser Lys Asp Val Asp  
 530 535 540  
 Val Gly Lys Trp Val Tyr Gly Ser Ser Val Pro Val Leu Pro Asn Glu  
 545 550 555 560  
 Lys Tyr Asn Met Arg Leu Leu Val Asp His Ser Ile Val Glu Gly Phe  
 565 570 575  
 Ala Gln Asn Gly Arg Thr Val Val Thr Ser Arg Val Tyr Pro Thr Lys  
 580 585 590  
 Ala Ile Tyr Asn Ala Ala Lys Val Phe Leu Phe Asn Asn Ala Thr Gly  
 595 600 605  
 Ile Arg Val Lys Ala Ser Val Lys Ile Trp Lys Met Ala Glu Ala Glu  
 610 615 620  
 Leu Asn Pro Phe Pro Val Thr Gly Trp Thr Ser  
 625 630 635

<210> 15  
 <211> 2107  
 <212> DNA  
 <213> Helianthus sp.

<400> 15  
 gcaccacaac acacttaagt gcgtgtacat aataaagaaa aaaccctcct gccaccacat 60  
 gatggcttca tccaccacca ccaccctct cattctccat gatgaccctg aaaacctccc 120  
 agaactcacc ggatctccga caactcgtcg tctatccatc gcaaaagtgc tttcggggat 180  
 ccttgtttctg gttctagtta catgtgctct tgttgcttta atcaacaacc aaacatatga 240  
 accaccgcg gccaccacat tcgcaactca gttgcaaat attgatctga agcgggttcc 300  
 aggaaagtgt gattcgagt ctgaggttga atggcaacga tccgcttctc attttcaacc 360  
 cgacaaaaat ttcattagt atcctgatgg cccaatgtat cacatgggat ggtaccatct 420  
 attctatcag tacaaccctg aatctgccat ctggggcaac atcacatggg gccactcggg 480  
 atcgaaagac atgatcaact ggttccatct ccctttcgcc atgggttcctg accattggta 540  
 cgacatcgaa ggtgtcatga cgggttcggc tacagtcctc cctaattggc aaatcatcat 600  
 gctttacacg ggcaacgcgt acgatctctc ccaagtacaa tgcttgcat acgctgtcaa 660  
 ctgctcggtat ccccttctta tagagtggaa aaaatatgaa ggtaaccctg tcttggtccc 720  
 accaccagga gtgggtaca aggactttcg ggacccatcc acattgtggt tgggccctga 780  
 tggggaatat agaattggtaa tgggtccaa gcacaacgag actattggat gtgctttgat 840  
 ttaccatacc actaatttta cgcattttga attgaaagag gaggtgcttc atgcagtccc 900  
 acatactggt atgtgggaat gtgttgatct ttaccacgtg tccaccgtac acacaaacgg 960  
 gttggacatg gtggataacg ggccaaatgt taaatacgtg ttgaaacaaa gtggggatga 1020  
 agatcgccat gattggtatg caattggaag ttatgatgtg gtgaatgata agtggtaccc 1080  
 ggatgacccg gaaaatgatg tgggtatttg attaagatat gattttggaa aattttatgc 1140  
 gtccaagact ttttatgacc aacataagaa gaggaggggc ctttggggct atgttgagga 1200



Val	Gln	Cys	Leu	Ala	Tyr	Ala	Val	Asn	Ser	Ser	Asp	Pro	Leu	Leu	Ile
		195					200					205			
Glu	Trp	Lys	Lys	Tyr	Glu	Gly	Asn	Pro	Val	Leu	Phe	Pro	Pro	Pro	Gly
	210					215					220				
Val	Gly	Tyr	Lys	Asp	Phe	Arg	Asp	Pro	Ser	Thr	Leu	Trp	Leu	Gly	Pro
225					230					235					240
Asp	Gly	Glu	Tyr	Arg	Met	Val	Met	Gly	Ser	Lys	His	Asn	Glu	Thr	Ile
				245					250					255	
Gly	Cys	Ala	Leu	Ile	Tyr	His	Thr	Thr	Asn	Phe	Thr	His	Phe	Glu	Leu
			260					265					270		
Lys	Glu	Glu	Val	Leu	His	Ala	Val	Pro	His	Thr	Gly	Met	Trp	Glu	Cys
		275					280					285			
Val	Asp	Leu	Tyr	Pro	Val	Ser	Thr	Val	His	Thr	Asn	Gly	Leu	Asp	Met
	290					295					300				
Val	Asp	Asn	Gly	Pro	Asn	Val	Lys	Tyr	Val	Leu	Lys	Gln	Ser	Gly	Asp
305					310					315					320
Glu	Asp	Arg	His	Asp	Trp	Tyr	Ala	Ile	Gly	Ser	Tyr	Asp	Val	Val	Asn
				325					330					335	
Asp	Lys	Trp	Tyr	Pro	Asp	Asp	Pro	Glu	Asn	Asp	Val	Gly	Ile	Gly	Leu
			340					345					350		
Arg	Tyr	Asp	Phe	Gly	Lys	Phe	Tyr	Ala	Ser	Lys	Thr	Phe	Tyr	Asp	Gln
		355					360					365			
His	Lys	Lys	Arg	Arg	Val	Leu	Trp	Gly	Tyr	Val	Gly	Glu	Thr	Asp	Pro
	370					375					380				
Gln	Lys	Tyr	Asp	Ile	Ser	Lys	Gly	Trp	Ala	Asn	Ile	Leu	Asn	Ile	Pro
385					390					395					400
Arg	Thr	Val	Val	Leu	Asp	Thr	Lys	Thr	Lys	Thr	Asn	Leu	Ile	Gln	Trp
				405				410						415	
Pro	Ile	Glu	Glu	Thr	Glu	Asn	Leu	Arg	Ser	Lys	Thr	Tyr	Asp	Glu	Phe
			420					425					430		
Lys	Asp	Val	Glu	Leu	Arg	Pro	Gly	Ser	Leu	Val	Pro	Leu	Glu	Ile	Gly
		435					440					445			
Thr	Ala	Thr	Gln	Leu	Asp	Ile	Val	Ala	Thr	Phe	Glu	Ile	Asp	Gln	Lys
	450					455					460				
Met	Leu	Glu	Ser	Thr	Leu	Glu	Ala	Asp	Val	Leu	Phe	Asn	Cys	Thr	Thr
465					470					475					480
Ser	Glu	Gly	Ser	Val	Ala	Arg	Gly	Ala	Leu	Gly	Pro	Phe	Gly	Val	Val
				485					490					495	
Val	Leu	Ala	Asp	Ala	Gln	Arg	Ser	Glu	Gln	Leu	Pro	Val	Tyr	Phe	Tyr
			500					505					510		

Ile Ala Lys Asp Ile Asp Gly Thr Ser Arg Thr Tyr Phe Cys Ala Asp  
 515 520 525  
 Glu Thr Arg Ser Ser Lys Asp Val Ser Val Gly Lys Trp Val Tyr Gly  
 530 535 540  
 Ser Ser Val Pro Val Leu Pro Gly Glu Lys Tyr Asn Met Arg Leu Leu  
 545 550 555 560  
 Val Asp His Ser Ile Val Glu Gly Phe Ala Gln Asn Gly Arg Thr Val  
 565 570 575  
 Val Thr Ser Arg Val Tyr Pro Thr Lys Ala Ile Tyr Asn Ala Ala Lys  
 580 585 590  
 Val Phe Leu Phe Asn Asn Ala Thr Gly Ile Ser Val Lys Ala Ser Ile  
 595 600 605  
 Lys Ile Trp Lys Met Ala Lys Ala Glu Leu Asn Pro Phe Pro Leu Pro  
 610 615 620  
 Gly Trp Thr Phe Glu Leu  
 625 630  
 <210> 17  
 <211> 615  
 <212> PRT  
 <213> Helianthus tuberosus  
 <400> 17  
 Met Gln Thr Pro Glu Pro Phe Thr Asp Leu Glu His Glu Pro His Thr  
 1 5 10 15  
 Pro Leu Leu Asp His His His Asn Pro Pro Gln Thr Thr Thr Lys  
 20 25 30  
 Pro Leu Phe Thr Arg Val Val Ser Gly Val Thr Phe Val Leu Phe Phe  
 35 40 45  
 Phe Gly Phe Ala Ile Val Phe Ile Val Leu Asn Gln Gln Asn Ser Ser  
 50 55 60  
 Val Arg Ile Val Thr Asn Ser Glu Lys Ser Phe Ile Arg Tyr Ser Gln  
 65 70 75 80  
 Thr Asp Arg Leu Ser Trp Glu Arg Thr Ala Phe His Phe Gln Pro Ala  
 85 90 95  
 Lys Asn Phe Ile Tyr Asp Pro Asp Gly Gln Leu Phe His Met Gly Trp  
 100 105 110  
 Tyr His Met Phe Tyr Gln Tyr Asn Pro Tyr Ala Pro Val Trp Gly Asn  
 115 120 125  
 Met Ser Trp Gly His Ser Val Ser Lys Asp Met Ile Asn Trp Tyr Glu  
 130 135 140  
 Leu Pro Val Ala Met Val Pro Thr Glu Trp Tyr Asp Ile Glu Gly Val  
 145 150 155 160

Leu	Ser	Gly	Ser	Thr	Thr	Val	Leu	Pro	Asn	Gly	Gln	Ile	Phe	Ala	Leu	
				165					170					175		
Tyr	Thr	Gly	Asn	Ala	Asn	Asp	Phe	Ser	Gln	Leu	Gln	Cys	Lys	Ala	Val	
			180					185					190			
Pro	Val	Asn	Leu	Ser	Asp	Pro	Leu	Leu	Ile	Glu	Trp	Val	Lys	Tyr	Glu	
		195					200					205				
Asp	Asn	Pro	Ile	Leu	Tyr	Thr	Pro	Pro	Gly	Ile	Gly	Leu	Lys	Asp	Tyr	
	210					215					220					
Arg	Asp	Pro	Ser	Thr	Val	Trp	Thr	Gly	Pro	Asp	Gly	Lys	His	Arg	Met	
225					230					235					240	
Ile	Met	Gly	Thr	Lys	Arg	Gly	Asn	Thr	Gly	Met	Val	Leu	Val	Tyr	Tyr	
				245					250					255		
Thr	Thr	Asp	Tyr	Thr	Asn	Tyr	Glu	Leu	Leu	Asp	Glu	Pro	Leu	His	Ser	
			260					265					270			
Val	Pro	Asn	Thr	Asp	Met	Trp	Glu	Cys	Val	Asp	Phe	Tyr	Pro	Val	Ser	
		275					280					285				
Leu	Thr	Asn	Asp	Ser	Ala	Leu	Asp	Met	Ala	Ala	Tyr	Gly	Ser	Gly	Ile	
	290					295					300					
Lys	His	Val	Ile	Lys	Glu	Ser	Trp	Glu	Gly	His	Gly	Met	Asp	Trp	Tyr	
305					310					315					320	
Ser	Ile	Gly	Thr	Tyr	Asp	Ala	Ile	Asn	Asp	Lys	Trp	Thr	Pro	Asp	Asn	
				325					330					335		
Pro	Glu	Leu	Asp	Val	Gly	Ile	Gly	Leu	Arg	Cys	Asp	Tyr	Gly	Arg	Phe	
			340					345					350			
Phe	Ala	Ser	Lys	Ser	Leu	Tyr	Asp	Pro	Leu	Lys	Lys	Arg	Arg	Ile	Thr	
		355					360					365				
Trp	Gly	Tyr	Val	Gly	Glu	Ser	Asp	Ser	Ala	Asp	Gln	Asp	Leu	Ser	Arg	
	370					375					380					
Gly	Trp	Ala	Thr	Val	Tyr	Asn	Val	Gly	Arg	Thr	Ile	Val	Leu	Asp	Arg	
385					390					395				400		
Lys	Thr	Gly	Thr	His	Leu	Leu	His	Trp	Pro	Val	Glu	Glu	Val	Glu	Ser	
				405					410					415		
Leu	Arg	Tyr	Asn	Gly	Gln	Glu	Phe	Lys	Glu	Ile	Lys	Leu	Glu	Pro	Gly	
			420					425					430			
Ser	Ile	Ile	Pro	Leu	Asp	Ile	Gly	Thr	Ala	Thr	Gln	Leu	Asp	Ile	Val	
		435					440					445				
Ala	Thr	Phe	Glu	Val	Asp	Gln	Ala	Ala	Leu	Asn	Ala	Thr	Ser	Glu	Thr	
	450					455					460					
Asp	Asp	Ile	Tyr	Gly	Cys	Thr	Thr	Ser	Leu	Gly	Ala	Ala	Gln	Arg	Gly	
465					470					475					480	

Ser Leu Gly Pro Phe Gly Leu Ala Val Leu Ala Asp Gly Thr Leu Ser  
485 490 495

Glu Leu Thr Pro Val Tyr Phe Tyr Ile Ala Lys Lys Ala Asp Gly Gly  
500 505 510

Val Ser Thr His Phe Cys Thr Asp Lys Leu Arg Ser Ser Leu Asp Tyr  
515 520 525

Asp Gly Glu Arg Val Val Tyr Gly Gly Thr Val Pro Val Leu Asp Asp  
530 535 540

Glu Glu Leu Thr Met Arg Leu Leu Val Asp His Ser Ile Val Glu Gly  
545 550 555 560

Phe Ala Gln Gly Gly Arg Thr Val Ile Thr Ser Arg Ala Tyr Pro Thr  
565 570 575

Lys Ala Ile Tyr Glu Gln Ala Lys Leu Phe Leu Phe Asn Asn Ala Thr  
580 585 590

Gly Thr Ser Val Lys Ala Ser Leu Lys Ile Trp Gln Met Ala Ser Ala  
595 600 605

Pro Ile His Gln Tyr Pro Phe  
610 615

<210> 18

<211> 630

<212> PRT

<213> Helianthus tuberosus

<400> 18

Met Met Ala Ser Ser Thr Thr Thr Thr Pro Leu Ile Leu His Asp Asp  
1 5 10 15

Pro Glu Asn Leu Pro Glu Leu Thr Gly Ser Pro Thr Thr Arg Arg Leu  
20 25 30

Ser Ile Ala Lys Val Leu Ser Gly Ile Leu Val Ser Val Leu Val Ile  
35 40 45

Gly Ala Leu Val Ala Leu Ile Asn Asn Gln Thr Tyr Glu Ser Pro Ser  
50 55 60

Ala Thr Thr Phe Val Thr Gln Leu Pro Asn Ile Asp Leu Lys Arg Val  
65 70 75 80

Pro Gly Lys Leu Asp Ser Ser Ala Glu Val Glu Trp Gln Arg Ser Thr  
85 90 95

Tyr His Phe Gln Pro Asp Lys Asn Phe Ile Ser Asp Pro Asp Gly Pro  
100 105 110

Met Tyr His Met Gly Trp Tyr His Leu Phe Tyr Gln Tyr Asn Pro Gln  
115 120 125

Ser Ala Ile Trp Gly Asn Ile Thr Trp Gly His Ser Val Ser Lys Asp  
130 135 140

Met	Ile	Asn	Trp	Phe	His	Leu	Pro	Phe	Ala	Met	Val	Pro	Asp	His	Trp	145	150	155	160
Tyr	Asp	Ile	Glu	Gly	Val	Met	Thr	Gly	Ser	Ala	Thr	Val	Leu	Pro	Asn	165	170	175	
Gly	Gln	Ile	Ile	Met	Leu	Tyr	Ser	Gly	Asn	Ala	Tyr	Asp	Leu	Ser	Gln	180	185	190	
Val	Gln	Cys	Leu	Ala	Tyr	Ala	Val	Asn	Ser	Ser	Asp	Pro	Leu	Leu	Ile	195	200	205	
Glu	Trp	Lys	Lys	Tyr	Glu	Gly	Asn	Pro	Val	Leu	Leu	Pro	Pro	Pro	Gly	210	215	220	
Val	Gly	Tyr	Lys	Asp	Phe	Arg	Asp	Pro	Ser	Thr	Leu	Trp	Ser	Gly	Pro	225	230	235	240
Asp	Gly	Glu	Tyr	Arg	Met	Val	Met	Gly	Ser	Lys	His	Asn	Glu	Thr	Ile	245	250	255	
Gly	Cys	Ala	Leu	Ile	Tyr	His	Thr	Thr	Asn	Phe	Thr	His	Phe	Glu	Leu	260	265	270	
Lys	Glu	Glu	Val	Leu	His	Ala	Val	Pro	His	Thr	Gly	Met	Trp	Glu	Cys	275	280	285	
Val	Asp	Leu	Tyr	Pro	Val	Ser	Thr	Val	His	Thr	Asn	Gly	Leu	Asp	Met	290	295	300	
Val	Asp	Asn	Gly	Pro	Asn	Val	Lys	Tyr	Val	Leu	Lys	Gln	Ser	Gly	Asp	305	310	315	320
Glu	Asp	Arg	His	Asp	Trp	Tyr	Ala	Ile	Gly	Ser	Tyr	Asp	Ile	Val	Asn	325	330	335	
Asp	Lys	Trp	Tyr	Pro	Asp	Asp	Pro	Glu	Asn	Asp	Val	Gly	Ile	Gly	Leu	340	345	350	
Arg	Tyr	Asp	Phe	Gly	Lys	Phe	Tyr	Ala	Ser	Lys	Thr	Phe	Tyr	Asp	Gln	355	360	365	
His	Lys	Lys	Arg	Arg	Val	Leu	Trp	Gly	Tyr	Val	Gly	Glu	Thr	Asp	Pro	370	375	380	
Gln	Lys	Tyr	Asp	Leu	Ser	Lys	Gly	Trp	Ala	Asn	Ile	Leu	Asn	Ile	Pro	385	390	395	400
Arg	Thr	Val	Val	Leu	Asp	Leu	Glu	Thr	Lys	Thr	Asn	Leu	Ile	Gln	Trp	405	410	415	
Pro	Ile	Glu	Glu	Thr	Glu	Asn	Leu	Arg	Ser	Lys	Lys	Tyr	Asp	Glu	Phe	420	425	430	
Lys	Asp	Val	Glu	Leu	Arg	Pro	Gly	Ala	Leu	Val	Pro	Leu	Glu	Ile	Gly	435	440	445	
Thr	Ala	Thr	Gln	Leu	Asp	Ile	Val	Ala	Thr	Phe	Glu	Ile	Asp	Gln	Lys	450	455	460	





[illegible]

[illegible]

<400> 21															
Met	Gly	Ser	His	Gly	Lys	Pro	Pro	Leu	Pro	Tyr	Ala	Tyr	Lys	Pro	Leu
1				5					10					15	
Pro	Ser	Asp	Ala	Ala	Asp	Gly	Lys	Arg	Thr	Gly	Cys	Met	Arg	Trp	Ser
			20					25					30		
Ala	Cys	Ala	Thr	Val	Leu	Thr	Ala	Ser	Ala	Met	Ala	Val	Val	Val	Val
		35					40					45			
Gly	Ala	Thr	Leu	Leu	Ala	Gly	Leu	Arg	Met	Glu	Gln	Ala	Val	Asp	Glu
	50					55					60				
Glu	Ala	Ala	Ala	Gly	Gly	Phe	Pro	Trp	Ser	Asn	Glu	Met	Leu	Gln	Trp
65					70					75					80
Gln	Arg	Ser	Gly	Tyr	His	Phe	Gln	Thr	Ala	Lys	Asn	Tyr	Met	Ser	Asp
				85					90					95	
Pro	Asn	Gly	Leu	Met	Tyr	Tyr	Arg	Gly	Trp	Tyr	His	Met	Phe	Tyr	Gln
			100					105					110		
Tyr	Asn	Pro	Val	Gly	Thr	Asp	Trp	Asp	Asp	Gly	Met	Glu	Trp	Gly	His
		115					120					125			
Ala	Val	Ser	Arg	Asn	Leu	Val	Gln	Trp	Arg	Thr	Leu	Pro	Ile	Ala	Met
	130					135					140				
Val	Ala	Asp	Gln	Trp	Tyr	Asp	Ile	Leu	Gly	Val	Leu	Ser	Gly	Ser	Met
145					150					155					160
Thr	Val	Leu	Pro	Asn	Gly	Thr	Val	Ile	Met	Ile	Tyr	Thr	Gly	Ala	Thr
				165					170					175	
Asn	Ala	Ser	Ala	Val	Glu	Val	Gln	Cys	Ile	Ala	Thr	Pro	Ala	Asp	Pro
			180					185					190		



Phe Cys Gln Asp Glu Leu Arg Ser Ser Arg Ala Lys Asp Val Thr Lys  
 515 520 525

Arg Val Ile Gly Ser Thr Val Pro Val Leu Asp Gly Glu Ala Leu Ser  
 530 535 540

Met Arg Val Leu Val Asp His Ser Ile Val Gln Gly Phe Asp Met Gly  
 545 550 555 560

Gly Arg Thr Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ser Tyr Gln  
 565 570 575

Glu Ala Arg Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Thr  
 580 585 590

Ala Glu Arg Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu  
 595 600 605

Ser Asn Glu Asp Asp Gly Met Tyr Leu His Gln Val Leu Glu Ser Arg  
 610 615 620

His  
 625

FOOEOI = 26220001